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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/698,476

11/03/2003

Wei-Chi Liu

82544

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03/09/2005

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EXAMINER

PAREKH, NITIN

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 03/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/698,476

Applicant(s)

LIU ET AL.

Examiner

Nitin Parekh

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 December 2004.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11-03-03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
~~Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).~~
~~Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).~~
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 5, 8, 10 and 13-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Kim et al. (US Pat. 5552635).

Regarding claims 1, 2, 5, 10 and 13-17, Kim et al. disclose a composite thermal dissipating element (TDE)/thermally emissive structure (TES) of a chip (Fig. 6) comprising:

- a substrate (71 in Fig. 6)
- a chip (74 in Fig. 6) being mounted/fastened on the substrate
- the composite TDE including a cap/cover (79 in Fig. 6) including connected sections comprising a top plate, side plate and a sole plate and a lump/heat spreader (see HS 77 in Fig. 6)
- the top plate curving and extendedly connecting the side plate and the sole plate extendedly connecting the side plate (each section not numerically referenced- see shape of 79 in Fig. 6) and the top plate having a top and bottom surfaces

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- the sole plate being adhered/fastened on the substrate
- the lump/heat spreader (see HS 77 in Fig. 6) including a top face, a bottom face and a side wherein the lump is fastened/bonded inside the cap/cover having the top face contacting the bottom surface using a high thermal conductivity compound/adhesive to improve heat dissipation (see 78 in Fig. 6; Col. 5, lines 5-15) and the bottom face contacting the chip (see 77 and 74 respectively in Fig. 6), and
- the lump/HS being made of metal material such as aluminum or copper (Col. 4, line 65)

(Fig. 6; Col. 4, line 25- Col. 5, line 25; Col. 1-5).

Regarding claims 8 and 18, Kim et al. teach the entire claimed structure as applied to Claims 1 and 16 respectively above, wherein Kim et al. further teach the lump/HS having a configuration such that the side contacts the side plate (see 99 and 97 respectively in Fig. 8; Col. 5, line 55- Col. 6, line 13).

Regarding claims 19 and 20, Kim et al. teach the entire claimed structure as applied to Claim 16 above, wherein Kim et al. teach all portions of the bottom face/surface of the lump/HS being adhesively bonded/ fastened to the chip (see 77 and 74 being bonded by 76 in Fig. 6),

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3, 4, 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US Pat. 5552635) in view of Li (US Pat. 5982621).

Regarding claims 3, 4, 6 and 7; Kim et al. teach substantially the entire claimed structure as applied to claim 1 above, wherein Kim et al. further teach the lump/HS having a variety of shapes and configurations (see Fig. 10A-D; Col. 4, lines 55-60), but fail to teach the shape of the bottom face or top face having a circular or quadrilateral shape respectively.

Li teaches a thermally dissipating structure comprising a lump/block having a circular top/bottom surfaces (see 14/20 in Fig. 3-8; Col. 2 and 3) having a circular shape.

It would have been obvious to a person of ordinary skill in the art at the time invention was made to incorporate shape of the bottom or the top face having a circular or quadrilateral shape as taught by Kim et al. and Li so that the desired surface/interface contact area can be achieved in Kim et al's TDE.

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US Pat. 5552635) in view of Kurokawa (US Pat. 5291064).

Regarding claim 9, Kim et al. teach substantially the entire claimed structure as applied to claim 1 above, except the lump being a silicon chip.

Kurokawa teaches a thermally dissipating structure comprising a lump/HS where the lump/HS is made of a variety of material such as silicon plate/chip, aluminum plate, copper plate, etc. (see 5a, 5b, etc. in Fig. 1, 2 respectively) to provide improved thermal conductivity and heat dissipation (Col. 3, lines 20-25; Col. 4, line 46; Col. 2-4).

It would have been obvious to a person of ordinary skill in the art at the time invention was made to incorporate the lump being the silicon chip as taught by Kurokawa so that the thermal dissipation can be increased in Kim et al's TDE.

7. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US Pat. 5552635) in view of Admitted prior art (APA).

Regarding claim 11, Kim et al. teach substantially the entire claimed structure as applied to claim 1 above, except the side plate/sole plate including a plurality of holes between the side plate and the sole plate.

The APA teaches a conventional cover plate having the side plate/sole plate including a plurality of holes between the side plate and the sole plate (see 151 in Fig. 1A; specification pages 1-3) to provide the desired adhesion of a molding compound.

It would have been obvious to a person of ordinary skill in the art at the time invention was made to incorporate the side plate/sole plate including a plurality of holes between the side plate and the sole plate as taught by the APA so that the adhesion of the molding compound can be improved in Kim et al's TDE.

8. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US Pat. 5552635) in view of Ho et al. (US Pat. 6369455).

Regarding claim 12, Kim et al. teach substantially the entire claimed structure as applied to claim 1 above, except the sole plate including a plurality of cavities.

Ho et al. teach a conventional thermally dissipating structure (Fig. 13/14) comprising a cover plate having a sole plate section (100/100' and 101/101' respectively in Fig. 13 and 14) where the sole plate section includes a plurality of cavities (not numerically referenced- see Fig. 13/14; Col. 1, line 32- Col. 2, line 18).

It would have been obvious to a person of ordinary skill in the art at the time invention was made to incorporate the sole plate including a plurality of cavities as taught by Ho et al. so that the desired adhesion of the molding compound and positioning of the cover can be achieved in Kim et al's TDE.

Response to Arguments

9. Applicant's arguments filed 12-09-04 have been fully considered but they are not persuasive.

A. Applicant contends that the heat spreader/lump and the metal cap/TDE are two separate elements instead of a single TDE.

However, the limitations as recited in claim 1 include the TDE comprising "a cover" and "a lump". Similarly the limitations as recited in claim 16 include the TDE including "a top plate, a side plate, a sole plate and a lump". As explained above, Kim et al. teach the structure comprising the composite TDE comprising the cap/cover and the lump/HS as claimed. Furthermore, in the present invention the lump is fastened/bonded to the cover by the adhesive (see specification pp. 10) as taught in Kim et al's (see 78 in Fig. 6) structure comprising the TDE.

B. Applicant contends that in Kim et al., the heat spreader and the metal cap are separately and sequentially adhered on the chip and the substrate respectively.

Therefore that at least two processes are needed to glue the heat spreader and the metal cap on the chip and the substrate respectively.

However, the claims 1-20 are directed to a device/structure and not a method of making such device/structure.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nitin Parekh whose telephone number is 571-272-1663. The examiner can normally be reached on 09:00AM-05:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9318.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

NP

02-25-05



NITIN PAREKH

PRIMARY EXAMINER

TECHNOLOGY CENTER 2800